

Perception of family functioning: psychometric analysis of Family APGAR Scale in adolescents in Lima

Percepción del funcionamiento familiar: Análisis psicométrico de la Escala APGAR-familiar en adolescentes de Lima

Humberto Castilla^{1ad*}, Tomas Caycho^{1b}, Midori Shimabukuro^{1cd} & Amalia Valdivia^{1ad}

¹Universidad Inca Garcilaso de la Vega, Lima, Perú.

^aBachelor in Psychology. ^bMaster in Educational Psychology. Director of the UIGV Psychology and Social Work School's Research Institute. ^cPsychology Student. ^dAssistant - Researcher from the UIGV Psychology and Social Work School's Research Institute.

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*Correspondencia

Email: acastillacabello@gmail.com

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Summary

The article describes the psychometric analysis of the APGAR Scale developed by Smilkstein (1978), consisting of five Likert items with five alternatives, which evaluates the perception of family functioning (Gómez & Ponce, 2010). The scale was administered to 256 male students aged from 11 to 18 attending state school in Lima. Item-test correlation analysis provided evidence of highly significant relations ($p < 0.001$) for each of the reagents, indicating that reagents evaluate indicators of the same construct. To assess the perception of family functioning, APGAR Scale has moderate internal consistency (Cronbach $\alpha = .788$). Construct validity was established by factor analysis and a single factor was obtained through a principal component analysis and the orthogonal rotation (Varimax).

Key words: Factor analysis, reliability, perception of family functioning, validity.

Resumen

El artículo describe el análisis psicométrico de la Escala APGAR de Smilkstein (1978), integrada por 5 ítems de tipo likert con cinco alternativas, la cual evalúa la percepción del funcionamiento familiar (Gómez & Ponce, 2010). La escala se administró a 256 estudiantes varones de 11 a 18 años de edad de un colegio nacional de Lima. El análisis de correlación ítem-test encontró asociaciones altamente significativas ($p < .001$) para cada uno de los reactivos, indicando que los reactivos evalúan indicadores de un mismo constructo. La Escala APGAR para valorar la percepción del funcionamiento familiar presenta moderada consistencia interna (α de Cronbach = .788). La validez de constructo se estableció mediante análisis factorial obteniendo, por medio análisis de componentes principales y la rotación ortogonal (Varimax), un único factor.

Palabras clave: Análisis factorial, confiabilidad, percepción del funcionamiento familiar, validez.

Introduction

This article aims at showing a preliminary psychometric analysis of APGAR Scale of family functioning, developed by Smilkstein (1978). Various efforts were made to conceptualize family. During decades, family has been defined in several forms, so that this definition has been characterized by constant changes, something that is natural due to constant society changes.

Within scientific literature, Romer et al. (1999) consider family as a bio-psycho-social unit wherein one of the most important functions is to contribute to all its members' health by transmitting beliefs and values from parents to children. Furthermore, family is defined as a system of individuals, who decided to live together and/or interrelate with the primary objective to support each other, the relationship of whom is formed through blood ties, adoption, guardianship or marriage, but they are united by strong emotional ties through common characteristics (Friedemann, 1995; Harmon & Thalman, 1996).

It is important to emphasize that, in comparison to previous times, the current family system has been affected by significant changes in communication, structure and function; consequently, there is not necessarily a father-mother-children scheme, since other forms of family have arisen out due to some factors such as economic and value crisis, which cause a bigger effect on families with adolescents, who are exposed to increasing rates of violence, drug addiction, suicide, prostitution and crime, among others (Goldsmith & Cwikel, 1993; Sampson & Laub, 1994). Despite the variants in a family, it is a system that gives its members some features of family and personal identity due to its nature and qualities, by transmitting values and behavior patterns guiding them through congruent goals towards the purpose of life (Friedemann, 1995) and, thus, family turns into one of the most important environments, by excellence, since it is the primary main environment wherein the child can interact (Arias, 2013), which gives him training and motivation from the early years, so that its members can become adults in a productive manner for the society (Muñuzuri, 1994).

Based on the foregoing, family functionality gains more interest within the health scope. Some decades ago, attention was given to identifying

deficiencies, insufficiencies and dysfunctionalities. At present, efforts are increased to recognize strengths and potentialities in a family in order that as a group it can face difficulties that may arise out and provide support to its members.

Functional families are characterized by receiving support, comprehension and encouragement among their members, which enables to make a progress through normal stages of growth and development, by reflecting on family members certain functionality guidelines comprising a wide range of factors (Muñuzuri, 1994; Olson, et al. 1989). In the same vein, Gonzales (2001) highlights that it is common that families, considered as healthy or functional, show some features such as clear and direct communication, definition of roles, and autonomy of its members, ability to solve problems, cohesion and solidarity between their members.

From the systemic point of view, individuals of a family are seen as sub-systems developed at intrapersonal level and at the same time, at interpersonal level they see other family members as a context, either in duos or larger units; finally, this unit of members turns into a total family system level (Gonzales, 2001). In this sense, a family system achieves functionality through the congruence of four family processes which may be affected, the first one of these processes is coherence, whereby, through harmonic relations between family members, they provide a sense of family unity and belonging by means of internalization of respect, love, interest for each other, sharing of values and beliefs; the second one is individualization, which refers to personal identity structure, developed through communication with other systems, by the performance of roles and responsibilities, favoring talents, initiatives and knowledge that ensure understanding; the third process is system maintenance, which covers the majority of family and personal life strategies that give a sense of security and autonomy; finally, the fourth process is system change, which comprises the incorporation of new knowledge to assume different behaviors against personal, family and environmental internal pressures (Friedemann, 1995). Like Friedemann, Olson, Portner and Lavee (1985) describe three factors inside the functioning of a family group. The first one would be family cohesion, which is the extent to which the family members are connected or separated and it is defined as an emotional tie of family group; the second one is called family

adaptation, defined as the group ability to change, and the last one is called family communication, which refers to interaction processes between the members.

From several postulates, such as the one of Friedemann (1995) and Olson, Portner and Lavee (1985), there are many studies giving input regarding the relation between family functioning and psychological variables in adolescence. Researches performed in the decade of 90's establish that families with more family functionality have adolescent children with more self-esteem, less health and behavioral problems as well as better academic performance (Guevara & Duran 1999; Martínez, 1994; Rosas, 1999). Recent studies with adolescents report that family functionality is associated with alcohol and cigarette consumption as well as the onset of depressive symptoms (Gutiérrez-Saldaña, Camacho-Calderón, & Martínez-Martínez, 2007; Pérez, et al., 2007).

From these important findings, there is a need to have reliable instruments that are adjusted to national environment and that, in practice with adolescents, need to be short in use and time for assessing family functionality. Thus, APGAR Scale is one of few scales with these qualities and used as an instrument in several research programs. A study about psychometric properties of APGAR scale, in a sample of 91 Colombian students aged from 11 to 17 years, reported a Cronbach's alpha of .793 and a single factor which explained a 55% variance (Forero, Avendaño, Duarte & Campo-Arias, 2006). In a Mexican version of the scale, we could obtain as a result thereof a Cronbach's alpha of .770, with only one main component which explained a 52.9% total variance, in a sample of 1321 patients aged from 15 to 96 years appointed to a family medical consultation in a health center (Torres, 2006, cited in Gómez & Ponce, 2010).

Method

This is an instrumental research because it responds to problems aimed at showing psychometric properties of measurement instruments (León & Montero, 2007).

Participants

This study comprised the participation of 256 male students from years 1 to 5 of secondary education, aged from 11 to 18 years, and an mean age of 10 years, selected through an (intentional and non-probability) convenience sampling from the following inclusion criteria: (a) Be enrolled in a state secondary school, (b) Born in Peru and (c) aged from 11 to 18 years.

Instrument

Family APGAR Scale, whose psychometric structure is subject matter of this work, is a self-application scale developed by Smilkstein (1978). At the beginning, the scale was created in order to value, in a general and simple way, family functioning through the degree of satisfaction of each person subject matter of the survey with their family life and perception of their own family functioning. However, recently, Gómez and Ponce (2010) proposed new interpretations of family APGAR, by stating that even though the scale was created to measure family functioning, it actually failed to give a possibility to establish functionality and dysfunctionality, since Smilkstein's concept about family function was the care and support received by an individual from their own family; therefore, the research authors establish that the scale itself assesses the perception of family functioning through the exploration of the degree of satisfaction in the relations they have with their relatives through five different areas (which at the same time arise out reagents): adaptability, cooperation, development, affection and problem-solving capacity. These components are assessed through 5 closed questions, based on five-response-alternative, Likert-type Scale, whose value is from 0 (*never*) to 4 (*always*), with a maximum possible score of 20 and a minimum possible score of 0. The instrument is applied to school adolescents aged from 11 to 18 years in average, collectively with a duration of around 10 to 15 minutes.

Procedure

The family APGAR Scale developed by Smilkstein (1978) was applied in group to students in classrooms for 15 min in average. The students completed data related to gender, age, education level and type of family. The reliability

analysis was conducted by applying Cronbach's alpha coefficient. The validity was established by an exploratory factor analysis. Upon applying the instrument, some tests were discarded because: (a) they omitted data related to age and gender, (b) they contained 2 or more omissions and (c) they had unusual patterns such as selecting the same answer in the majority of items. The statistical analyses were conducted through Statistical Package for the Social Sciences, version 21 (SPSS.21).

Results

Reliability Coefficients

Item-Scale Correlation

With the aim of obtaining an appropriate internal consistency of the scale, successive correlations were made between each item and the total scale score without considering the same item. In this way no reagent was eliminated due to high correlations within the total set of items. The last scale had 5 reagents (Attachment A). Table 1 shows that Pearson product-moment correlations of 11 items were conserved, thus we can see statistically significant correlations in all of them ($p < .01$ for two tails) of more than .20 (Kline, 1998).

Cronbach's Alpha Coefficients

The fifth column of table 1 shows Cronbach's alpha coefficients for each of the 5 items wherein all alpha values are significant, in a range from .718 to .763. The total scale shows a moderate internal consistency through Cronbach's alpha coefficient ($\alpha = .785$). Besides, Spearman-Brown Split half coefficient was determined (unequal lengths) $r = .749$; which supports the results found out at the beginning. In short, we can assert that the family APGAR Scale of 5 items shows moderate reliability, according to several procedures used.

Table 1
Corrected Item-Test Coefficients

Ítem	<i>M</i>	<i>D.E</i>	<i>citc.</i>	∞
Ítem1	3.39	.975	.505**	.763
Ítem2	2.76	1.289	.567**	.745
Ítem3	2.94	1.142	.555**	.746
Ítem4	3.10	1.102	.643**	.718
Ítem5	3.09	1.190	.549**	.749

Cronbach's alpha coefficient = .788
Spearman-Brown split-half coefficient = .770

**p< .01 (two-tailed)
N = 256

Factor Validity of Family APGAR Scale

Kaiser-Meyer-Olkin Adequacy Measure and Barlett's Sphericity Test

In order to analyze the viability of the use of factor analysis to establish the construct validity of family APGAR Scale, the Kaiser-Meyer-Olkin (K-M-O) measures and Barlett's sphericity test were used. K-M-O adequacy measure obtains a score of .792 while Barlett's sphericity test shows a value of 253.571, which is significant at .00 level. These results state how appropriate conducting a factor analysis is.

Factor Analysis

The principal component method with orthogonal rotation was used through the Varimax method to estimate factors of family APGAR Scale in the total sample. The principal component analysis identified a component with eigenvalue of 2.704, which explains a 54.1% total variance. After rotation, to include a reagent in a factor, two criteria were taken into account: (a) saturations (loading) should be equal to or more than .45; (b) if the element is loading in two or more factors, it shall be included in the highest saturation factor.

Table 2 shows factor saturations corresponding to items of factor with loads of no less than .50 (Nunnally, 1987), assessed in Good or Excellent categories for the purposes of factor interpretation (Comrey, 1985).

Table 2

Matrix of Factors extracted by Varimax Rotation and Factor Loads of items

	Item	F1
1	I am satisfied with the support I receive from my family when something concerns me.	.677
2	I am satisfied with how my family discusses issues of common interest and shares the problem solution with me.	.742
3	My family accepts my desires to promote new activities or make changes in my lifestyle.	.727
4	I am satisfied with how my family expresses affection and responds to my feelings of love and sadness.	.800
5	I am satisfied with the time my family and I share.	.726
Eigenvalue		2.704
Explained variance		54.1%
Cronbach's alpha coefficient		.785

Discussion

The research was aimed to analyze psychometric properties of reliability and validity of the Smilkstein family APGAR Scale (1978), in a sample of students from a state school in the Metropolitan Lima area. In relation to the item-scale correlation analysis, the highest correlation refers to item 4 “I am satisfied with how my family expresses affection and responds to my feelings of love and sadness” ($r=.643$; $p<.01$), while the lowest correlation refers to item 1 “I am satisfied with the support received from my family when something concerns me” ($r=.505$; $p<.01$). Thus, correlation coefficients may be classified as moderate and high (Delgado, Ecurra & Torres, 2006). These results indicate that the 5 reagents measure indicators of a same construct, contributing to measurement effectively. In relation to internal scale consistency, the findings in this work ($\alpha=.785$) are similar to the findings of Forero, Avendaño, Duarte and Campo-Arias (2006) ($\alpha=.793$) and Gómez (2010) ($\alpha=.770$), so that they are considered appropriate (Campo-Arias & Oviedo, 2008). Variability, even minimal, between indexes of reliability among these populations must be due to, as stated by Prieto and Delgado

(2010), sample variability.

The factorization process shows the structure underlying the scale. We can see that the factor weight of each item is focused on a single underlying factor behind the family functionality construct, similar to the information originally furnished by Smilkstein (1978). This result shows the existence of factor coherence between the items. The results enable to conclude that family APGAR Scale has an appropriate factor validity, which ensures certain coherence among measurements referred to the construct under measurement (Muñiz, 1996). Our results coincide with the ones reported by Forero, et al. (2006) and Gómez (2010) who, by applying a factor analysis, indicate the existence of a model specifying a single factor. This factor contains 5 items from the family APGAR Scale, which explains a 54.1% total variance so that their loads are high and with a high reliability index ($\alpha = .788$). Despite this, we can assume the existence of other family functionality factors not explained by the scale items (Arias & Herrera, 1994).

The variance explained by the factor is greater than 20%, which is a minimum needed percentage to establish one-dimensionality (Carmines & Zeller, 1979; cited in Domínguez, Villegas, Sotelo & Sotelo, 2012). On the other hand, all factor values were of more than .50, which evidences that reagents significantly contribute to evaluate the family functionality construct, which corroborates factor structure. Furthermore, findings gathered from the factor analysis meet three criteria stated by Anastasi (1974) to be considered an appropriate analysis: simple structure, positive saturations and easiness to interpret.

The use of an exploratory and non-confirmatory factor analysis is justified based on two important reasons: firstly, in social sciences it is difficult to specify the correlation value with each factor; secondly, having no previous information on the behavior of items in the Peruvian context renders impossible to conduct a confirmatory analysis requiring the guidance of previous assumptions (Domínguez, Villegas, Yauri, Mattos & Ramirez, 2012).

The results show that family APGAR Scale applied to Peruvian adolescents has appropriate psychometric properties, which enable to

consider it as a valid and reliable measure of family functionality that may be used in future research projects relating this variable to other socio-demographic or personality variables. It should be mentioned the continuity of research projects evidencing convergent, divergent and predictive validity of the scale in larger samples in order to continue evaluating usefulness in Peruvian samples.

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ATTACHMENT A

Family APGAR Scale

Authors: Smilkstein (1978)

Age:..... Gender: Educational Institution:.....

Year:.....

City: Evaluation Date:.....

Instructions: Here are some phrases for you to think of your way of being. We would like you to answer each of the following questions with an X in the box which best represents the frequency in which you perform those actions, according to the following scale:

0: Never **1:** Almost never **2:** Sometimes

3: Almost always **4:** Always

	Never	Almost Never	Sometimes	Almost Always	Always
1. I am satisfied with the support I receive from my family when something concerns me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I am satisfied with how my family discusses issues of common interest and shares the problem solution with me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. My family accepts my desires to promote new activities or make changes in my lifestyle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I am satisfied with how my family expresses affection and responds to my feelings of love and sadness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I am satisfied with the time my family and I share.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>